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(56) Documents Cited

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(58) Field of Search

UK CL (Edition T) A6M MAK MAX

INT CL⁷ A63B 22/16 23/00 23/04 23/08 23/10

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(54) Abstract Title

Leg exerciser

(57) A device for exercising legs whilst in a seated position. The device has a base unit 12 having the central part of its lower surface 13 convexly curved along the longitudinal axis and two foot rests 11 pivotally secured by pins 16, ball and socket joints (33, fig 6) or snap-fit connectors (44, fig 10) to the upper surface 10 of the base unit. Springs (26, fig 5) may be incorporated between the base and the foot rests. The foot rests may have raised lips 17 to prevent the feet slipping from the device, or straps or contoured surfaces (34, fig 9) may be provided. In use, the user presses down on a foot rest with one foot causing a reciprocal motion upwards to the other foot, and then repeats the process with the other foot, imparting a rocking motion to the device. The device is intended to reduce the risk of circulatory problems developing as a result of sitting in cramped conditions for an extended period of time, eg on long-haul aircraft flights.

In a second embodiment, rockable foot rests may be attached to a stationary base unit.

Fig 3

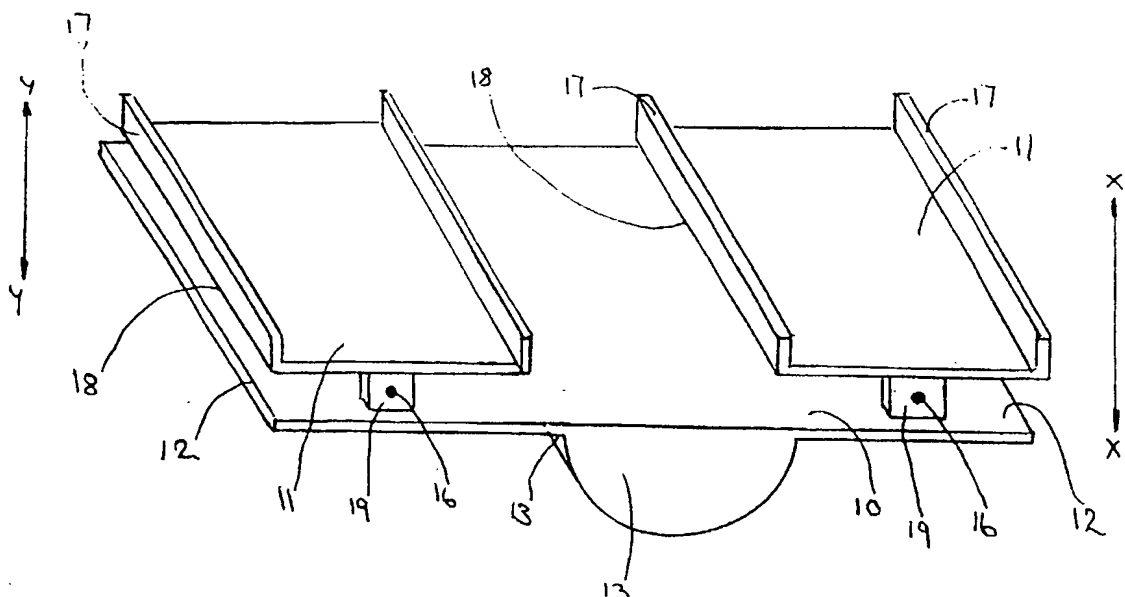


Fig 1

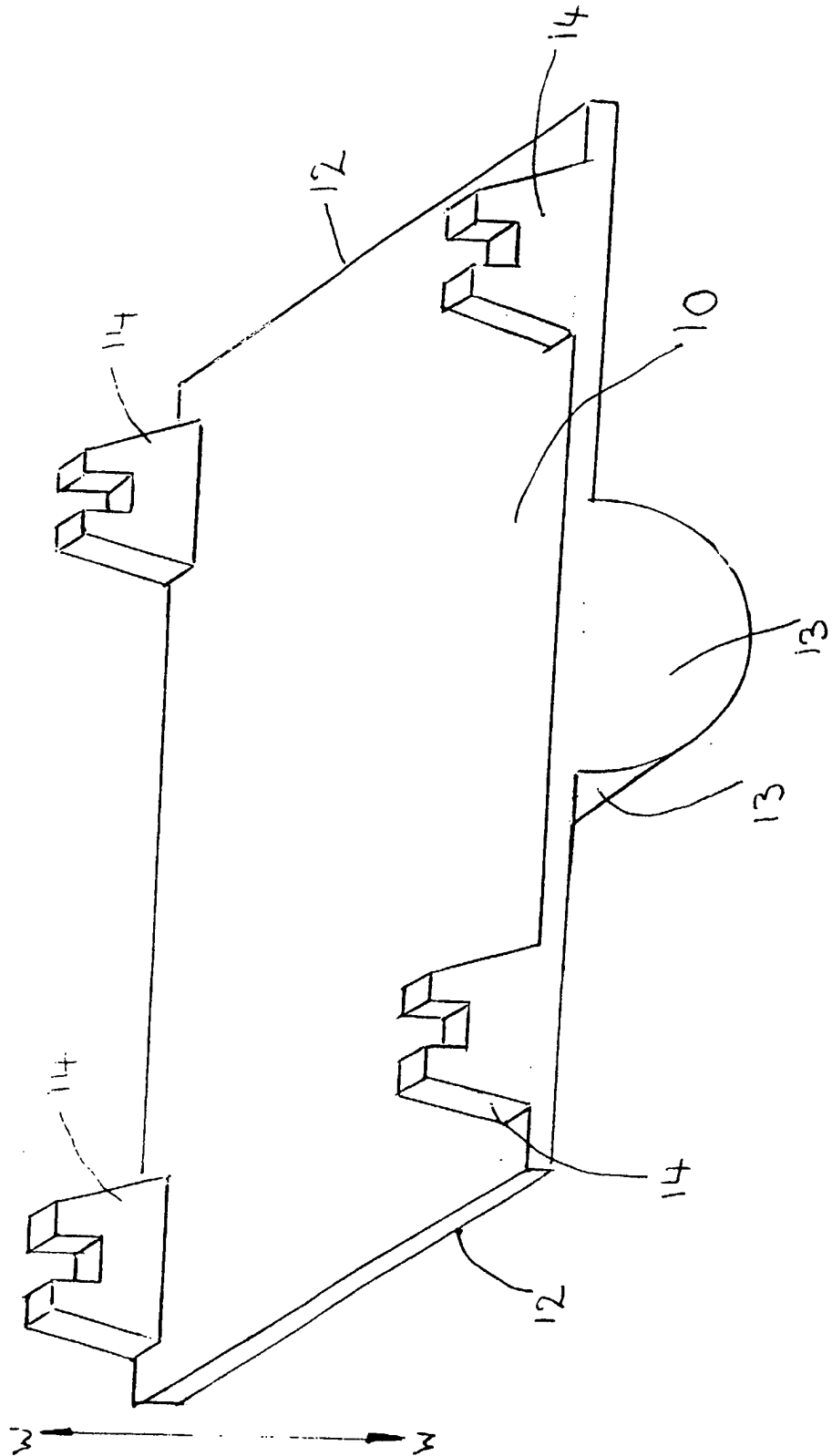
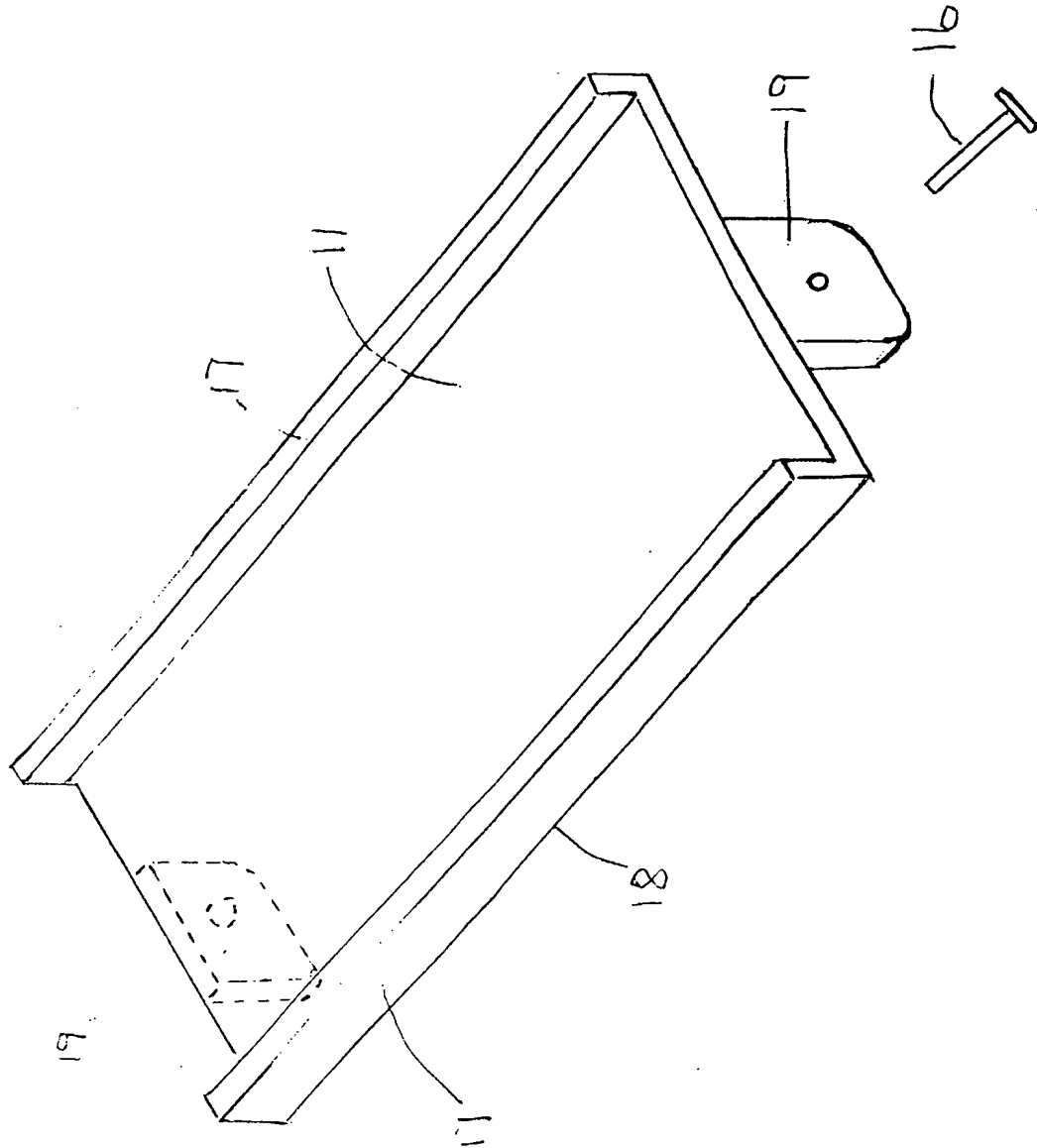
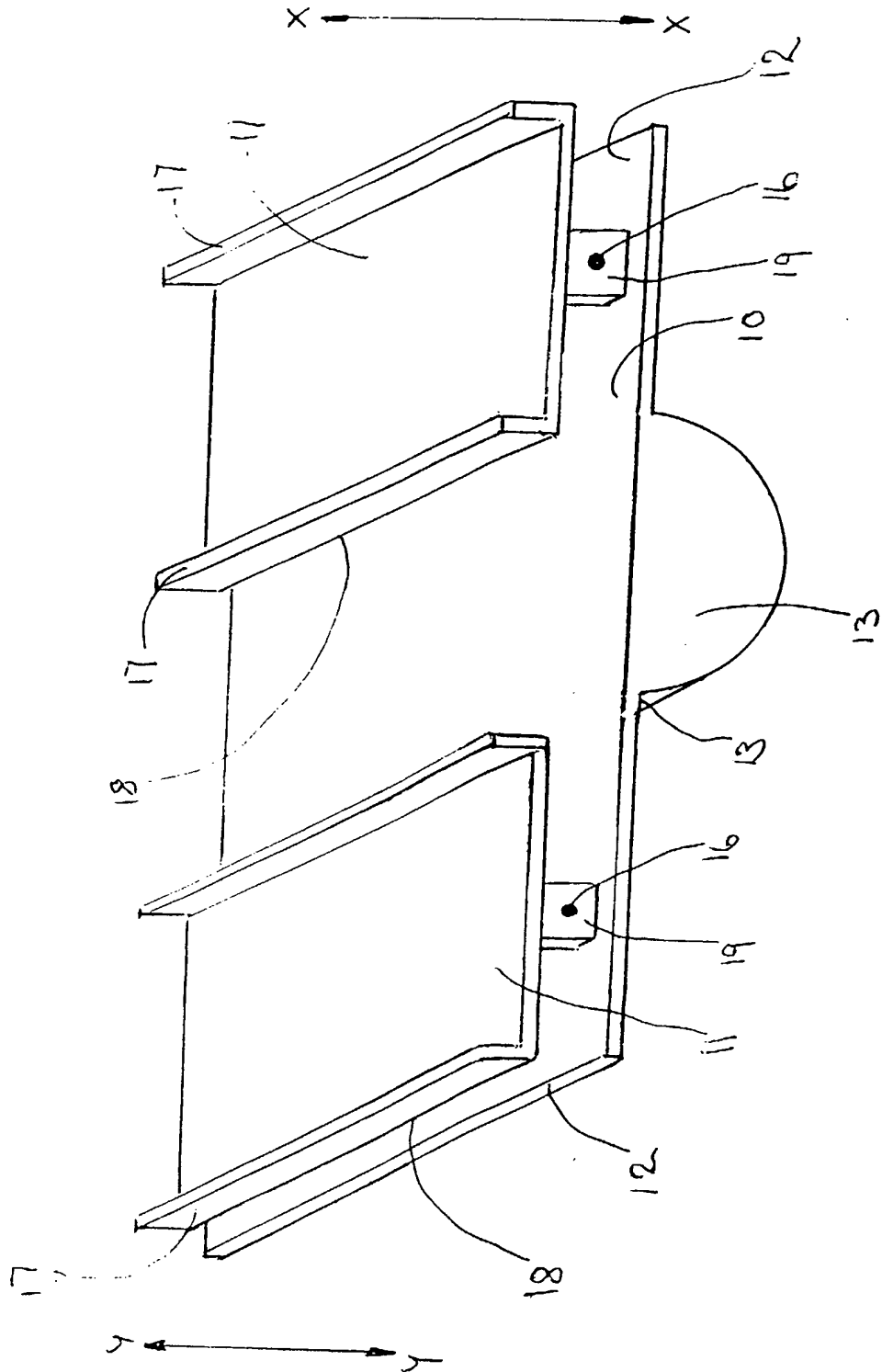


Fig 2



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Fig 3



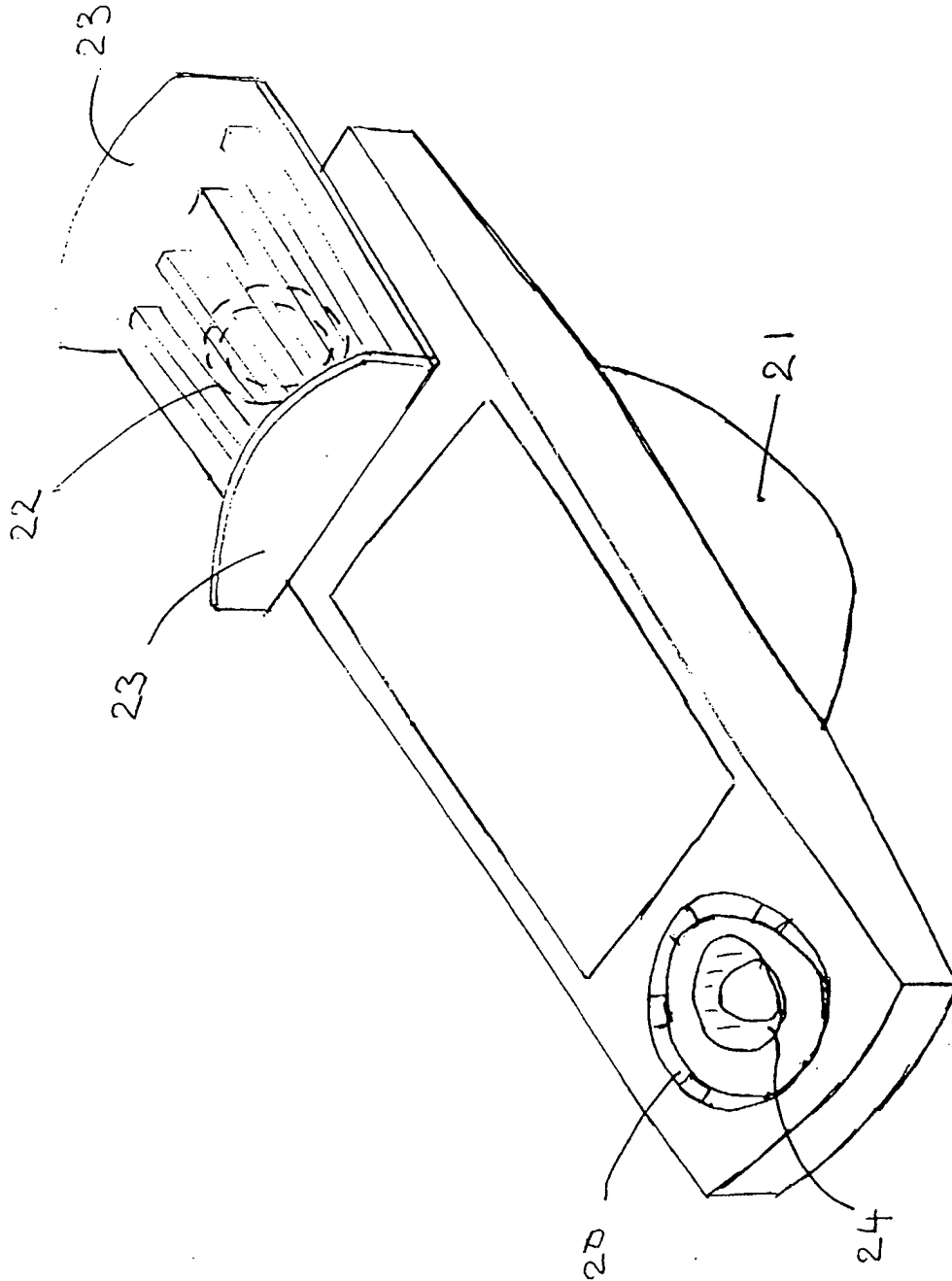


Fig 4

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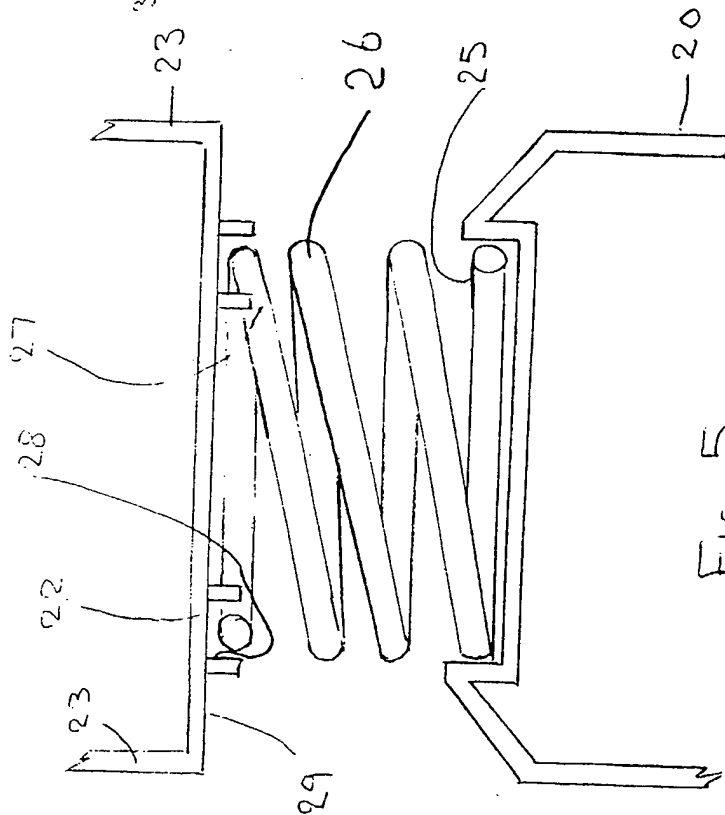


Fig 5

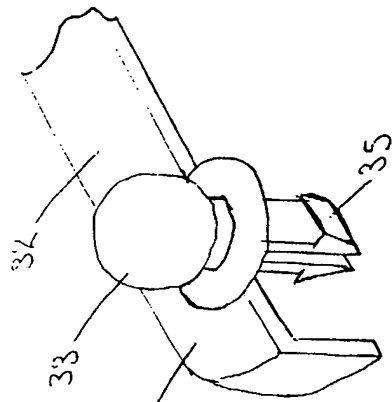


Fig 6

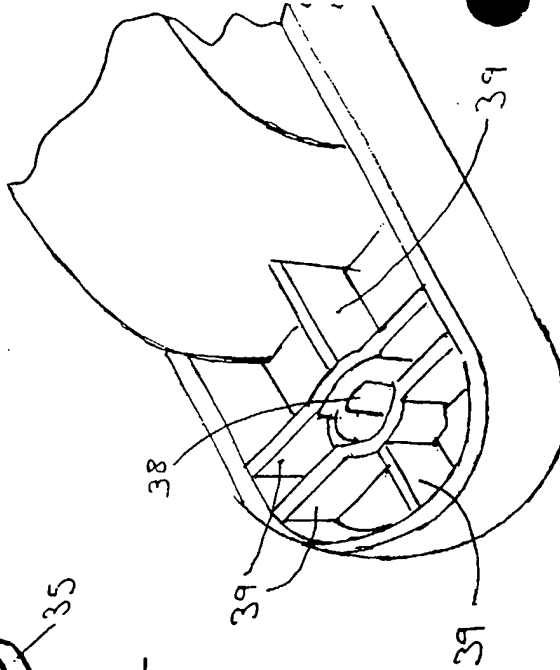


Fig 7

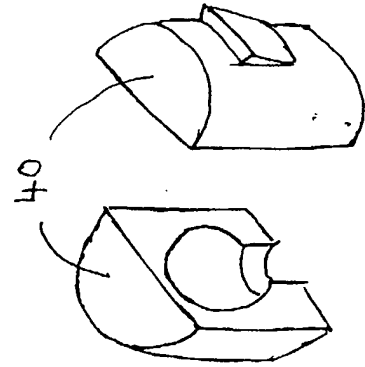


Fig 8

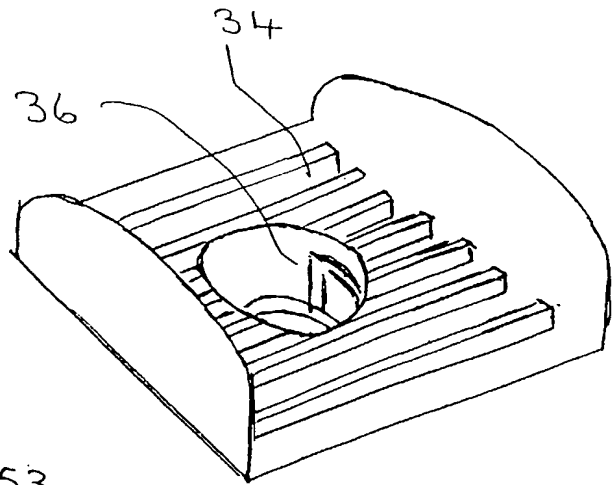


Fig 9

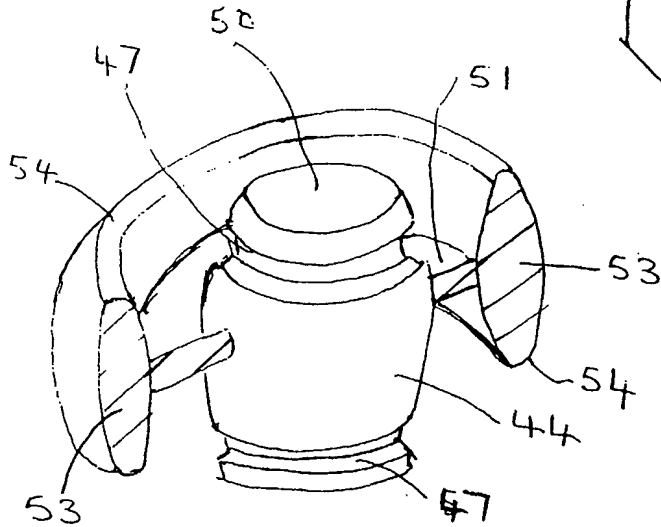


Fig 10

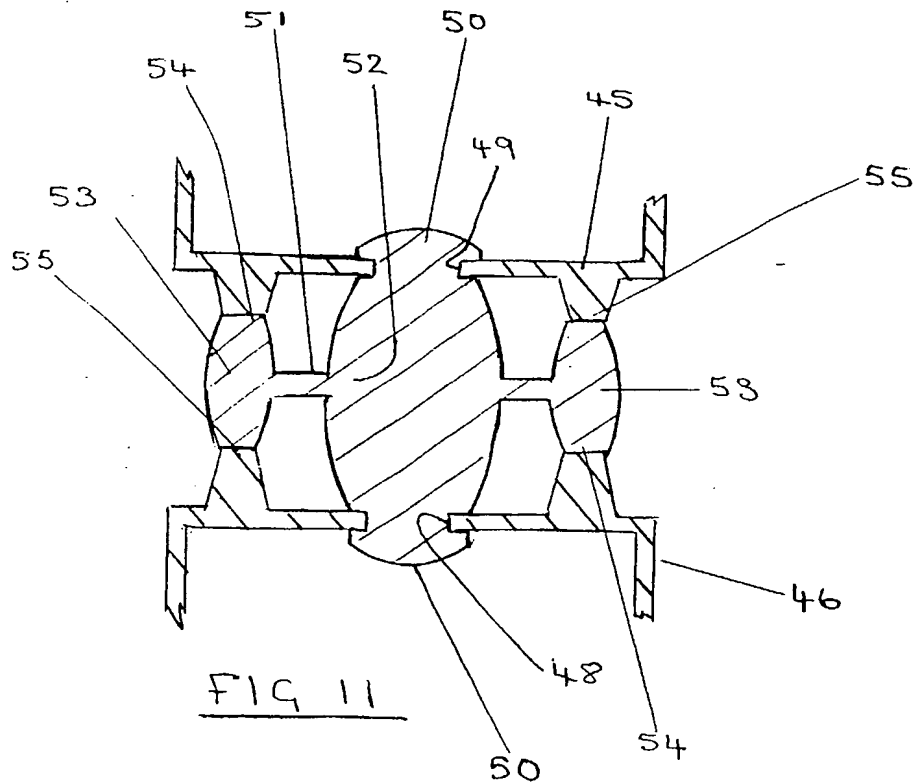


Fig 11

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LEG EXERCISER

The present invention relates to a method of exercising the legs whilst in a sitting position.

It has been noticed that when sitting for an extended period of time that there is a tendency for the legs to suffer from stiffness and cramp. Whilst these problems alone are not life threatening it is becoming clear that in some cases this lack of leg movement may also give rise to circulatory problems and may be a reason for a condition known as deep vein thrombosis.

It is know medical fact that the legs act as a secondary pump to the heart. The simple act of walking enables the legs to perform this pumping action and thus aid the circulation of the blood from the legs to the upper body thus helping to maintain a healthy blood flow.

It is found that the pumping action of the legs can be reduced if the person is confined to a sitting position. Whilst this may not cause problems in the short term, circulatory problems may arise if the person is forced to remain in a cramped sitting position for an extended length of time, for example on a long haul aircraft flight. Other examples include long journeys in cars or coaches, and chair-bound people.

It has been found in some cases that due to the lack of leg movement and therefore a reduction in the blood flow to and from the lower legs there can be a tendency for the blood in the lower legs to form blood clots. These clots are referred to as deep vein thrombosis which can cause problems including pulmonary and cardiac blood stoppages, sometimes with fatal results.

The present invention seeks to solve these difficulties.

According to the present invention there is a leg exerciser comprising:

1. A base.
2. Footrests.

The present invention also comprises a leg exerciser.

Preferably the leg exerciser is provided with means to enable a rocking action to take place.

Preferably also the leg exerciser is provided with means to accept foot rests.

Preferably also the leg exerciser incorporates foot rests.

Preferably also the leg exerciser allows the foot rest to move in either or an up and down direction.

Preferably also the leg exerciser is made of wood, plastics, metal or a combination of these materials.

Preferably also the leg exerciser comprises a base plate adapted to support the feet of a person wishing to exercise their legs.

Preferably also the base plate is provided with means to enable a rocking action of the base plate to take place.

Preferably also the base plate is provided with means to accept foot rests.

Preferably also the leg exerciser incorporates foot rests.

Preferably also the leg exerciser allows each foot rest to move in either an up or down direction.

Preferably also the leg exerciser allows each foot rest to move in either an up or down direction relative to the base plate.

Preferably also the said up or down direction is about axes transverse to the width of the base plate, whereby the person's heels turn sideways and up or down. Alternatively said up or down direction is about an axis along the width of the base plate, whereby the person's heels and lower legs move up or down.

Preferably also the leg exerciser allows each foot rest to move in either an up or down direction by the rocking action of the base plate.

Preferably also the said up or down direction is about axes transverse to the width of the base plate, whereby the person's heels turn sideways and up or down, and is also about an axis along the width of the base plate, whereby the person's heels and lower legs move up or down.

Preferably also the leg exerciser allows each foot rest to move in either an up or down direction relative to the base plate about axes transverse to the width of the base plate, and allowing the base plate to undergo a rocking action for each foot rest to move vertically up or down.

Preferably also the said up or down direction is about axes transverse to the width of the base plate, whereby the person's heels turn sideways and up or down, and allowing each foot rest to move in either an up or down direction by the rocking action of the base plate.

Preferably also each foot rest is provided with means to contain a person's foot inside the foot rest.

Preferably also a raised edge constitutes said means to contain the person's foot inside the foot rest.

The base plate may be provided with means to accept foot rests, said means comprising pivot pins, springs, ball joints, or elongated resilient spherical blocks.

Preferably also the leg exerciser is made of wood, plastics, metal or a combination of these materials.

Specific embodiments of the invention will now be described with reference to the accompanying drawings in which:

Fig 1 shows in perspective, the base plate of a first specific embodiment,

Fig 2 shows in perspective, the foot rests of the first specific embodiment,

Fig 3 shows in perspective, the base plate of Fig 1 with the foot rests of Fig 2 affixed.

Fig 4 is a perspective view of the base plate of a second embodiment,

Fig. 5 is a cross section of a foot rest and part of the base plate of the second embodiment,

Fig 6 is a perspective top view of part of the base plate of a third embodiment,

Fig 7 is a perspective underside view corresponding to Fig 6,

Fig 8 is a perspective view of a socket for use with a foot rest for the base plate of Figs 6 and 7,

Fig 9 is a perspective view of the foot rest to carry the socket of Fig 8,

Fig 10 is a partial perspective view of a modification of the third embodiment, and

Fig 11 is a cross-sectional elevation corresponding to Fig 10.

Referring to Figs 1-3 of the drawings, the leg exerciser comprises a base plate 10 and two foot rests 11 disposed in parallel on top of the base plate 10 just short of the ends 12 of the base plate 10. The width of the base plate 10 is from one end 12 to the other end 12.

The base plate 10 is provided with an integral semi-circular cross-section straight rib 13 across its underside transverse to the width of the base plate 10, and midway between the two foot rests 11. The rib 13 acts as a rocker on a flat surface for the base plate 10 to rock up and down in directions x-x and y-y shown in Fig. 3. Alternatively the base plate 10 is provided with means such as a roller, lever mechanism, springs or the like to enable the base plate to move up and down in a rocking movement, or the base plate 10 may be a fixed plate constructed so as to allow the foot plate or plates 11 to adopt a rocking movement by means of levers springs or the like in the direction of arrows x-x and or in the direction of arrows y-y in Fig 3.

The base plate 10 is provided with means such as lugs 14 designed or adapted to allow the foot plates 11 to be mounted on to the base plate 10 and to enable the foot plates 11 to be either permanently affixed to the base plate 10 or constructed or adapted in such a way as to enable the foot plate or plates 11 to be removable.

The foot rests 11 are provided with means to contain the feet inside the foot rests 11 by means such as a raised edge 17 along each longitudinal side 18 of each foot rest 11 transverse to the width of the base plate 10. The edges 17 stop the feet of the person wishing to exercise their legs on the leg exerciser from slipping sideways off the foot rests 11.

The foot rests 11 are provided with means such as pivot pins 16 through short flanges 19 one at each end of each foot rest 11, and engaging with the lugs 14 of the base plate 10. The pivot pins 16 allow the foot rests to pivot about parallel axes transverse to the width of the base plate 10, with or without the base plate 10 rocking in the direction of arrows x-x and /or in the direction of arrows y-y. Without rocking the base plate 10, the person's heels turn sideways and up or down. With rocking of the base plate 10, the foot rests can be kept horizontal, with the person's feet alternately moving up and down.

By placing the leg exerciser on the floor and placing both feet on the foot rests 11 it is found that the legs are able to move up and down in opposition to each other thus allowing both legs to be exercised whilst in a sitting position and thereby aid blood circulation.

In modifications of the first specific embodiment the foot rests may be made without raised edges to contain the foot, and may instead be provided with other means for this purpose such as a moulded skid-proof surface pattern, or the foot rest may be provided with a strapping to contain the foot. Further modifications of this embodiment of the invention will be apparent to those skilled in the art without departing from the scope of the present invention.

In the second preferred specific embodiment, a base plate 20 with an integral rocker rib 21 similar to the base plate 10 and integral rocker rib 13 of the first embodiment is moulded in plastic and is also provided with a pair of foot rests 22. Each foot rest 22 has raised side edges 23 to stop the person's foot from slipping sideways off the foot rest 22. Fig 4 shows only one foot rest 22 in place, with the other foot rest 22 omitted to show how it would be mounted in position.

A circular recess 24 in the top of the base plate 20 can receive one end 25 of a cylindrical spring 26 of which the other end 27 fits into a recess 28, similar to the recess 24, in the underside 29 of the foot rest 22. This is shown in Fig 5. The spring allows the foot rest 22 to be displaced sideways by a person's foot in the same way as in the first embodiment, and to be tilted forwards and backwards, and for the foot rest to be displaced vertically relative to the base plate. All of these movements do work against the resilience of the spring, increasing the amount of exercise given to the person's legs.

Alternatively the cylindrical spring 26 may be replaced by a compression rubber or plastic arrangement whereby the rubber or plastic, in compression by the force of the person's feet, gives movement in any desired direction, and also gives resistance to aid the person's circulation and heart pumping action on the legs.

In a third specific embodiment shown in Figs 6-9, a base plate 32 is the same as the base plate 20 of the second specific embodiment shown in Figs 4 and 5, but is provided with a ball joint 33 for mounting each foot rest 34. Each ball joint 33 is moulded in a resilient plastic, and has a split latching base 35 snap-fitted into a mounting recess 36 in the top surface 37 of the base plate 32, as can be seen in Fig 6. Fig 7 shows the underside of the base plate 32 with an annular wall 38 defining the mounting recess 36 and supported by stiffening ribs 39. Each base 35 can easily be removed from the base plate 32.

Fig 8 shows a pair of half sockets 40 that are fitted together and inserted in each foot rest 34 to form a socket for the ball joint 33, as shown in Fig 9. The half sockets 40 are readily removable from each foot rest 34.

Figs 10 and 11 show a modification of the third specific embodiment in which the ball joint 33 is replaced by an elongated resilient spherical block 44 which mounts each foot rest 45 on a base plate 46. The block 44 has an annular groove 47 towards each end. One groove 47 of each block 44 snaps into a circular hole 48 in the base plate 46, and the other groove 47 snaps into a circular hole 49 in the foot rest 45. The ends 50 of the block 44 beyond the grooves 47 are flattened off.

With the passenger's foot pushing on a foot rest 45, the foot rest 45 can be angled relative to the base plate 46 against the resilience of the deformation of the block 44. To increase the resistance of the block 44 to such deformation even more, a flat web 51 extends radially outwardly from the equator 52 of the block 44 and terminates in an annular flange 53, which in cross-section as shown in Fig 11, flanks the block 44 and has its upper and lower surfaces 54 received in annular recesses 55 under the foot rest 45 and on the top of the base plate 46. Angling of the foot rest 45 relative to the base plate 46 therefore also deforms the squeezed part of the flange 53. Consequently the passenger can work hard on the leg exerciser as modified as shown in Figs 10 and 11, to exercise his calf muscles and legs.

CLAIMS

1. A leg exerciser
2. A leg exerciser as claimed in claim 1 provided with means to enable a rocking action to take place.
3. A leg exerciser as claimed in claims 1 and 2 provided with means to accept foot rests.
4. A leg exerciser as claimed in claims 1 - 3 incorporating foot rests.
5. A leg exerciser as claimed in claims 1 – 4 allowing the foot rest to move in either or an up and down direction.
6. A leg exerciser as claimed in any preceding claim, which is made of wood, plastics, metal or a combination of these materials.
7. A leg exerciser herein with reference to the accompanying drawings.
8. A leg exerciser as claimed in Claim 1 comprising a base plate adapted to support the feet of a person wishing to exercise their legs.
9. A leg exerciser as claimed in Claim 8 wherein the base plate is provided with means to enable a rocking action of the base plate to take place.
10. A leg exerciser as claimed in Claims 8 and 9 wherein the base plate is provided with means to accept foot rests.
11. A leg exerciser as claimed in Claim 10 incorporating foot rests.
12. A leg exerciser as claimed in Claim 11 allowing each foot rest to move in either an up or down direction.
13. A leg exerciser as claimed in Claim 12 allowing each foot rest to move in either an up or down direction relative to the base plate.
14. A leg exerciser as claimed in Claim 13 wherein said up or down direction is about axes transverse to the width of the base plate, whereby the person's heels turn sideways and up or down.

15. A leg exerciser as claimed in Claim 13 wherein said up or down direction is about an axis along the width of the base plate, whereby the person's heels and lower legs move up or down.
16. A leg exerciser as claimed in Claim 9 and 11 allowing each foot rest to move in either an up or down direction by the rocking action of the base plate.
17. A leg exerciser as claimed in Claims 14 and 15 wherein said up or down direction is about axes transverse to the width of the base plate, whereby the person's heels turn sideways and up or down, and is also about an axis along the width of the base plate, whereby the person's heels and lower legs move up or down
18. A leg exerciser as claimed in Claims 14 and 16 allowing each foot rest to move in either an up or down direction relative to the base plate about axes transverse to the width of the base plate, and allowing the base plate to undergo a rocking action for each foot rest to move vertically up or down.
19. A leg exerciser as claimed in Claims 16 and 17 wherein said up or down direction is about axes transverse to the width of the base plate, whereby the person's heels turn sideways and up or down, and allowing each foot rest to move in either an up or down direction by the rocking action of the base plate.
20. A leg exerciser as claimed in any one of Claims 11 to 19 wherein each foot rest is provided with means to contain the person's foot inside the foot rest.
21. A leg exerciser as claimed in Claim 20 wherein a raised edge constitutes said means to contain the person's foot inside the foot rest.
22. A leg exerciser as claimed in Claim 10 wherein said means to accept foot rests comprises pivot pins.
23. A leg exerciser as claimed in Claim 10 wherein said means to accept foot rests comprises springs.

24. A leg exerciser as claimed in Claim 10 wherein said means to accept foot rests comprises ball joints.
25. A leg exerciser as claimed in Claim 10 wherein said means to accept foot rests comprises elongated resilient spherical blocks.
26. A leg exerciser as claimed in any preceding claim, which is made of wood, plastics, metal or a combination of these materials.
27. A leg exerciser substantially as described herein with reference to and as shown in Figs 1-3 of the accompanying drawings.
28. A leg exerciser substantially as described herein with reference to and as shown in Figs 4 and 5 of the accompanying drawings.
29. A leg exerciser substantially as described herein with reference to and as shown in Figs 6-9 of the accompanying drawings.
30. A leg exerciser substantially as described herein with reference to and as shown in Figs 10 and 11 of the accompanying drawings.



INVESTOR IN PEOPLE

Application No: GB 0111646.6
 Claims searched: 1-30

12

Examiner: Wayne Fleet
 Date of search: 24 June 2002

Patents Act 1977 Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

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Int Cl (Ed.7): A63B 23/00, 23/04, 23/08, 23/10, 22/16

Other: Online: WPI, EPODOC, JAPIO

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2093708 A (GRUSS) See fig 3	1, 2, 8 & 9
X, Y	EP 0862930 A1 (DELOS) See fig 2 (note pivot pins 18 securing rocking platform to base)	X: 1, 2 & 6 Y: 22
X, Y	DE 029800489 U1 (THIEME SPORT) See WPI Abstract Accession No. 98-208754/19 (note base rockable about two perpendicular axes)	X: 1, 2, 6, 8 & 9 Y: 17 & 19
X	JP 2000334066 A (NITTEI) See WPI Abstract Accession No. 01-106997/12 and figures	1-6, 8-21, 26
X	JP 020088085 A (JIEI) See PAJ Abstract & figures	1, 2, 6, 8 & 9
X, Y	US 6042521 (DE GIORGIS) See fig 5 (note ball and socket joints)	X: 1-6 Y: 24
X	US 5330399 (FAN) See fig 1 (note rockable base and foot pedals with raised edges)	1-6, 8-14, 16, 20, 21 & 26
Y	US 4739986 (KUCHARIK) See fig 1 (note springs)	23

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

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INVESTOR IN PEOPLE

Application No: GB 0111646.6
Claims searched: 1-30

Examiner: Wayne Fleet
Date of search: 24 June 2002

Category	Identity of document and relevant passage	Relevant to claims
X, Y	US 4101136 (CORLL) See figs 1 & 9 (note rockable base and rockable foot rests)	X: 1-6, 8-14, 16, 18 & 26 Y: 17, 19, 22-24

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

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